

September 25, 2013

To the Dietary Guidelines Advisory Committee:

The Johns Hopkins Center for a Livable Future is an academic research and education center based at the Bloomberg School of Public Health that investigates the interconnections among food systems, public health, and the environment. We are pleased to submit a comment on seafood consumption recommendations for the next Dietary Guidelines for Americans (DGA or Guidelines). As stated in the 2010 DGA, the document's ultimate goal is to "improve the health of our Nation's current and future generations by facilitating and promoting healthy eating and physical activity choices so that these behaviors become the norm among all individuals." Regarding seafood consumption, there is a risk that future generations will not have access to a variety of seafood due to unsustainable production practices and growing demand for seafood. Current recommendations to more than double Americans' seafood intake, with no guidance on sustainable choices, could dramatically reduce the availability of seafood and threaten food security in the future.

According to the DGA, Americans consume an average of 3.5 ounces of seafood per week, and the 2010 DGA recommends increasing consumption to 8 ounces per week (pg. 39) to increase intake of the marine omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and other nutrients (USDA USHHS 2010). Women who are pregnant or breastfeeding are encouraged to eat up to 12 ounces per week to provide EPA and DHA to their baby, as these fatty acids are beneficial for brain and nervous system development. To address confusion surrounding seafood nutrition and safety, the 2010 Guidelines provide valuable information on the average levels of marine fatty acids and mercury, the most thoroughly studied seafood contaminant, in commonly eaten species (Appendix 11, pg. 85). It also lists four key fish species that vulnerable human populations need to avoid due to mercury contamination (pg. 39). Providing information on how to balance the risks and benefits of consuming seafood is important. In addition, to ensure future generations' access to a variety of seafood, the 2015 DGA must include information on how seafood choices impact sustainability and food security for future generations. This is especially important given the recommendation to more than double average consumption.

Seafood Production

Our concerns regarding the quantity and quality of seafood and the Guidelines stem from ongoing challenges that exist for fisheries and aquaculture. Annual global production of edible seafood from wild fisheries and aquaculture, or farmed seafood, is about 130 million tons (FAO 2012). Seafood is the most highly traded food commodity (Asche and Smith 2009), and therefore global production is important for the committee to consider. The US imports a large proportion of seafood for domestic consumption; in 2012 the US imported edible fishery products worth \$16.7 billion and exported \$5.12 billion (NOAA 2012).

Overharvesting of Wild Fisheries

It is hard to overstate the dire situation of global wild fisheries, and it is unrealistic to expect an ever-increasing global harvest to provide for increased rates of human consumption. Wild caught seafood harvests peaked in the 1980s, and currently 85% of the world's fisheries are fully

exploited, overexploited, depleted, or recovering (FAO 2010). Some scientists predict that if current trends continue, humans could completely overfish the oceans by 2048 (Worm et al., 2006). Commercial fishers are seeing diminishing returns even after moving further offshore, fishing in deeper waters, and targeting species lower in the marine food chain due to declining populations and diminishing size of individual fish in traditionally-favored species (Pauly et al., 1998; Watson and Morato 2013). In addition, destructive fishing methods, such as bottom trawling and dredging, threaten future food security by removing the majority of aquatic life and habitat in an area. These methods impact many aquatic life forms that are not used for food but are essential parts of the ecosystem, causing a major loss of biodiversity in the ocean and disruption of the aquatic food web, thus impacting species we rely on for food (Simon and Dayton 2002; Pauly et al., 2002). Fishing practices also impact present food security, because fishermen usually focus on one or a few marketable species, and other shellfish and fish caught are discarded as bycatch, even though they could be used to increase the global supply of edible seafood. In summary, current fishing practices are unsustainable, and recommending increased seafood consumption with no guidance on sustainable choices could further contribute to these problems and lead to drastic decreases in the amount of wild-caught seafood for human consumption in the future.

Growth of Aquaculture and Sustainability Concerns

Aquaculture, or farmed seafood, grew at an average rate of 8.8% from 1980-2010 (FAO 2012). This expansion has allowed a growing demand for seafood to be met, since wild fisheries cannot be significantly expanded, and now about half of the seafood consumed in the US and around the globe comes from aquaculture. Importantly, aquaculture includes a vast array of production methods and species ranging from shellfish, which filter surrounding water and require no feed, to carnivorous finfish, which rely on formulated feed made with wild fish. In 2010, 16.6% of wild-caught fish (15 million metric tons) were processed into fishmeal and fish oil, and the majority of both products were used in aquaculture feed (FAO 2012). Aquaculture's reliance on fishmeal and fish oil as feed is problematic as wild fish stocks continue to decline (Naylor et al., 2009).

In addition to relying on wild fish as feed, some production methods have significant impacts on marine ecology and public health. Large-scale offshore finfish aquaculture uses open nets or pens and can result in pollution from concentrated waste, chemicals, metals, uneaten feed, and veterinary drugs including antibiotics (Goldburg et al., 2001). The US Food and Drug Administration does not inspect 98% of imported seafood (Love et al., 2011), which undoubtedly allows tainted seafood to enter the marketplace. Contaminants in seafood are not limited to mercury, and also include chemicals and drugs used on farms, algal toxins, and microorganisms (i.e., bacteria, viruses, protozoan parasites). In addition, disease-transfer and use of certain chemicals impacts nearby fish populations where commercial or recreational fishing may occur, thus impacting food safety and food security (Sapkota et al., 2008; Cole et al., 2009; Homer 2010; Trotter and Cooke 2013). These issues highlight the importance of providing guidance on sustainable seafood choices to Americans, whether it is from wild or farmed sources.

Global Changes with Local Impacts

Climate change affects both wild and farmed seafood in several ways. Ocean acidification (a decrease in the pH of the ocean) is a direct result of climate change, which has already begun to

damage shellfish production and propagation in certain parts of the world. In cool Northern latitudes, pathogenic bacteria, such as *Vibrio vulnificus*, which previously only thrived in warm, nutrient-rich water are emerging and causing unexpected diseases. Additional effects of climate change on aquaculture and fisheries are beginning to be studied, and a possible outcome could be a decreased supply in the quantity and variety of seafood available for consumption.

Seafood Consumption

Previous generations of humans ate large, long-lived aquatic animals, but the populations of those animals have been significantly reduced. In a process known as “fishing down the food chain”, humans are catching smaller, shorter-lived animals due to drastic population declines at the top of the aquatic food web (Pauley et al., 1998). Encouraging Americans to eat lower on the aquatic food chain more often would be better for sustainability, and in the future, fish lower on the food chain may be the only species remaining in the oceans. In addition, because contaminants bioaccumulate up the food chain, fish lower on the food chain also have lower levels of contaminants.

Consideration should be given to advice for vegetarians, vegans, and people who do not like or are allergic to seafood. A growing trend is to produce supplements or fortify foods with EPA and DHA using omega-3-rich oils made from algae or wild fish (Bernstein et al., 2012). There are gaps in the scientific literature regarding the health benefits of supplements and fortified foods. Algae oil could become an important source of marine omega-3s with little risk of contamination, since it would not be produced in the ocean, but more research is needed on this topic.

Recommendations for the 2015 Dietary Guidelines for Americans

To ensure that seafood is available to more people today and for future generations, the 2015 Dietary Guidelines for Americans should:

1. Encourage Americans to choose products that are lower on the aquatic food chain (i.e., shellfish and small oily fish like sardines and herring), and refrain from recommending specific species that are associated with harmful fishing or farming practices (i.e., shrimp or farmed Atlantic salmon);
2. Distinguish between farmed and wild seafood, including in any tables and figures, and provide information on practices that threaten or promote health and ecological sustainability;
3. Present seafood consumption advice developed in consult with experts in the fields of fisheries, aquaculture, and environmental health to ensure that the recommendations are realistic and achievable based on current aquatic food resources and trends; and
4. Provide links to references and guides on wild and farmed seafood for consumers to seek additional information on this complicated topic (i.e., NOAA *FishWatch* and/or Monterey Bay Aquarium *Seafood Watch*).

Conclusion

Current recommendations in the DGA are at odds with the Earth’s capacity to provide seafood. Future recommendations regarding seafood consumption should take into account declining

fisheries and the myriad externalities of certain types of aquaculture to ensure that seafood stocks remain viable to enable long-term compliance with dietary recommendations.

For additional information to assist in clarifying the seafood consumption guidelines in the DGA, please contact Jillian Fry, PhD MPH (JFry@jhsph.edu) or Dave Love, PhD MSPH (DLove@jhsph.edu).

Sincerely,

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